Abstract

The quasilinearization technique is an interesting and fruitful method for solving nonlinear initial and boundary value problems. This method not only proves the existence of the solutions but also provides an iteration scheme whose iterates converge uniformly and quadratically to a unique solution of the problem.

The nineties brought new dimensions to this technique when this method was generalized, refined, and extended in several directions to make it applicable to a much larger class of nonlinear problems.

In this thesis, we develop an improved form of quasilinearization technique for a nonlinear second order ordinary differential equation with nonlocal boundary conditions involving mixed nonlinearities, and obtain sequences of approximate solutions converging monotonically and quadratically to the unique solution of the problem. It is shown that the nonlinearities in the boundary conditions can be handled on the pattern similar to the one used in tackling the nonlinearity involved in the differential equation.

It is found that several interesting results can be recorded as a special case of the work established in this thesis.